

- 1) An expression vector encoding at least one peptide, said peptide comprising a sequence selected from the group consisting of: a) SEQ ID NO: 1-5, 7-10, and 12-24; b) a sequence having 95% identity to one of the sequences in part a); wherein expression of said peptide is controlled by a tightly regulated, inducible promoter.
- 2) The expression vector of claim 1, encoding a combination of peptides comprising sequences selected from the group consisting of SEQ ID NO: 2 and 3; SEQ ID NO: 3 and 4; SEQ ID NO: 2, 3, and 4; SEQ ID NO: 1, 2, 3, and 4; SEQ ID NO: 9 and 10; SEQ ID NO: 14 and 15; SEQ ID NO: 8 and 14; SEQ ID NO: 8 and 15; SEQ ID NO: 8, 14, and 15; SEQ ID NO: 16, 17, and 18; SEQ ID NO: 17 and 18; SEQ ID NO: 16, 17, 18, and 19; SEQ ID NO: 17, 18, and 19; and SEQ ID NO: 20, 21, and 22.
- 3) The expression vector of claim 1, encoding peptides comprising sequences SEQ ID NO: 8, 14, and 15.
- 4) The expression vector of claim 1, said peptide having a sequence selected from the group consisting of SEQ ID NO: 1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, and 24.
- 5) A protein, comprising a sequence selected from the group consisting of: a) SEQ ID NO: 1-5, 7-10, 12-24; and b) a sequence with 95% identity to one of the sequences in part a); wherein the protein is anti-bacterial, is purified and is made by recombinant technology or by peptide synthesis.
- 6) The protein of claim 5, having a sequence selected from the group consisting of: a) SEQ ID NO: 1-5, 7-10, and 12-24.
- 7) A method of treating infection, said method comprising:
 - a) identifying a bacterial infection; and
 - b) *in vivo* delivery of an anti-bacterial protein of claim 5 to a warm blooded animal having a bacterial infection, in an amount sufficient to treat the bacterial infection.
- 8) The method of claim 7, wherein a combination of peptides comprising sequences selected from the group consisting of SEQ ID NO: 2 and 3; SEQ ID NO: 3 and 4; SEQ ID NO: 2, 3, and 4; SEQ ID NO: 1, 2, 3, and 4; SEQ ID NO: 9 and 10; SEQ ID NO: 14 and 15; SEQ ID NO: 8 and

- 14; SEQ ID NO: 8 and 15; SEQ ID NO: 8, 14, and 15; SEQ ID NO: 16, 17, and 18; SEQ ID NO: 17 and 18; SEQ ID NO: 16, 17, 18, and 19; SEQ ID NO: 17, 18, and 19; and SEQ ID NO: 20, 21, and 22; are delivered to said mammal.
- 9) The method of claim 7, wherein a combination of peptides comprising sequences of SEQ ID NO: 8, 14, and 15 are delivered to said mammal.
- 10) A method of designing an anti-bacterial peptidomimetic, comprising:
- a) isolating a protein of claim 5;
 - b) determining the three dimensional structure of said protein;
 - c) identifying the functional site of said protein;
 - d) designing a drug that mimics the structure of the active site of said protein;
 - e) testing the drug for anti-bacterial activity.
- 11) A method of inhibiting bacterial infection, said method comprising:
- a) identifying the presence of a bacteria in a mammal; and
 - b) administering to said mammal a protein comprising a sequence selected from the group consisting of: i) SEQ ID NO: 1-5, 7-10, and 12-24; ii) a sequence which has 95% identity to a sequence in i); and iii) a peptidomimetic small molecule which mimics the activity of a protein in i); in an amount effective to kill said bacteria.
- 12) The method of claim 11, wherein the protein is delivered by a method selected from the group consisting of bacteriophage, an expression vector, or direct administration of protein or a peptidomimetic small molecule.
- 13) The method of claim 11, wherein the protein comprises a combination of proteins having sequences selected from the group consisting of SEQ ID NO: 2 and 3; SEQ ID NO: 3 and 4; SEQ ID NO: 2, 3, and 4; SEQ ID NO: 1, 2, 3, and 4; SEQ ID NO: 9 and 10; SEQ ID NO: 14 and 15; SEQ ID NO: 8 and 14; SEQ ID NO: 8 and 15; SEQ ID NO: 8, 14, and 15; SEQ ID NO: 16, 17, and 18; SEQ ID NO: 17 and 18; SEQ ID NO: 16, 17, 18, and 19; SEQ ID NO: 17, 18, and 19; and SEQ ID NO: 20, 21, and 22.
- 14) The method of claim 13, wherein the proteins have the sequences of SEQ ID NO: 8, 14, and 15.

- 15) The method of claim 11, wherein the protein is fused to a cationic agent, a hydrophobic agent, a signal sequence, a lipid or combinations thereof, and is delivered by a method selected from: inhalation of an aerosolized anti-bacterial peptide; topical application; injection; and oral ingestion.
- 16) A method of identifying potential targets for antibiotic action, comprising:
- a) selecting bacterial mutants resistant to the lethal activity of a protein comprising any sequence selected from the group consisting of SEQ ID NO: 1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, and 24 and variants having at least 95% identity thereto;
 - b) identifying the genes in which such resistant mutations are located;
 - c) demonstrating by physical and/or genetic techniques an interaction between each lethal protein and its putative target.